# Service Quality Measurements
## Measurement Detail

| **Function:** | **Accuracy of Billing Records** |
|---|---|
| **Business Implications:** | The accuracy of billing records affects the accuracy of the billing ultimately delivered to local service customers, whether retail service or exchange access service customers. Billing for the elements from which CLEC services are constructed must be validated to assure that only correct charges are paid. This validation is necessary to assure that the cost structure for services is not inflated. Furthermore, charges such as "time and material" related charges may be on the invoice and need to be promptly passed on to customers (by CLECs) to avoid dissatisfaction regarding the timeliness of CLEC billing and to minimize customer inquiries on late billing. Fair competition requires that the accuracy of billing records (both usage and invoices) delivered by the ILEC to the CLEC must provide CLECs with the opportunity to delivery bills at least as accurate as those delivered by the ILEC. Producing and comparing this measurement result for both the ILEC and CLEC allows a determination as to whether or not parity exists. |
| **Measurement Methodology:** | **Invoice Accuracy = [(Number of Invoices Delivered in the Reporting Period that Have Complete Information, Reflect Accurate Calculations and are Properly Formatted) / Total Number of Invoices Issued in the Reporting Period )] x 100**<br><br>**Usage Accuracy = [(Number of Usage Records Delivered in the Reporting Period That Reflected Complete Information Content and Proper Formatting) / (Total Number of Usage Records Transmitted)] x 100**<br><br>**For CLEC Results:** The completeness of content, accuracy of information and conformance of formatting will be determined based upon the terms of the individual CLEC interconnection agreements with the ILECs. The ILEC will establish a quality control process that is disclosed to CLECs and that is no less rigorous than the most rigorous quality monitoring established in the ILEC billing service contracts for long distance service providers. The quality monitoring process must be disclosed in advance and process auditing must be permitted. The records and invoices delivered by the ILEC must simultaneously meet the standards relating to content, accuracy and formatting in order to be counted as accurate. Each of the above measurements, is expressed as a ratio (expressed as a percentage) of accurate records (or invoices) to the total records (or invoices) delivered.<br><br>**For ILEC Results:** The results computation for the ILEC is identical to that described for the CLECs. The usage accuracy determination is based upon comparison of the usage records, following conversion to the EMR (or equivalent) format as compared to the internally established content and formatting requirements. Likewise, the accuracy measure for invoice delivery will be based upon a statistically reliable comparison of ILEC invoices to the content, calculation methodology and formatting standards of the ILEC. Separate comparisons are to be made for retail service invoices and access invoices with the results compared to wholesale (TSR) and UNE invoices, respectively.<br><br>**Other Clarifications and Qualification:**<br><br>• The usage accuracy measure identified here is similar to the type of measures that the ILEC commonly has instituted in service contracted established with long distance service suppliers who use ILEC billing |

# Service Quality Measurements
## Measurement Detail

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|---|---|
| | services.<br>• The wholesale invoice accuracy identified here is analogous to the measures contained within the Billing Quality Assurance Programs that the ILECs have with IXCs for monitoring access billing quality. If a sampling process is used to monitor accuracy, then the study results must be reconfirmed no less than quarterly |

| **Reporting Dimensions:** | **Excluded Situations:** |
|---|---|
| • End user usage records<br>• Access usage records<br>• Alternately billed usage records<br>• Wholesale Bill Invoices (TSR)<br>• Unbundled Element Invoices (UNE) | • None |
| **Data Retained Relating To CLEC Experience:** | **Data Retained Relating To ILEC Performance:** |
| • Report Month<br>• Record or Invoice Type (per Reporting Dimensions)<br>• Accuracy | • Report Month<br>• Record or Invoice Type (per Reporting Dimensions)<br>• Accuracy |

| | |
|---|---|
| **Performance Standard in Absence of ILEC Results:** | If the ILEC does not deliver direct comparative results or the ILEC has not produced benchmark levels based upon a verifiable study of its own operation as agreed to with the CLEC, then result(s) related to the CLEC operation should be provided according to the following levels of performance in order to provide the CLEC with a meaningful opportunity to compete:<br>• Greater than 98% of usage records transmitted, by usage type, reflect the agreed upon format and contain complete information.<br>• Greater than 98% of wholesale bill, by invoice type, are financially accurate |

# Service Quality Measurements
## Measurement Detail

### Operator Services and Directory Assistance (OS, DA)

| **Function:** | **Speed To Answer** |
|---|---|
| **Business Implications:** | In order to assure that an unjustified competitive advantage is not created for the ILEC, the speed of answer delivered to CLEC retail customers, when the ILEC provides Operator Services or Directory Services on behalf of the CLEC, must be no slower than the speed of answer that the ILEC delivers to its own retail customers of equivalent local services. |
| **Measurement Methodology:** | **Mean Time To Answer =[ Σ(Date and Time of Call Answer) - (Date and Time of Call Receipt)]/(Total Calls Answered on Behalf of CLECs in Reporting Period)**<br><br>**For CLEC Results:** Speed of answer and call abandonment rates are monitored through the call management technology used to distribute calls to ILEC agents supporting CLEC activities (i.e., call receipt personnel staffing Directory Assistance or Operator Service Positions).<br><br>Speed of Answer is determined by measuring and accumulating the elapsed time from the entry of a CLEC retail customer call into the ILEC call management system queue until the CLEC retail customer call is transferred to the ILEC personnel assigned to handling CLEC calls for assistance (whether DA or OS). The elapsed time is measured in seconds and tenths of seconds rounded to the nearest tenth of a second.<br><br>**For ILEC Results:** Identical measures as described for the CLEC with the clarification provided below.<br><br>**Other Clarifications and Qualification:**<br><br>• This measure is directly analogous to speed of answer minimum service standards established within many states.<br>• Results may be reported for the CLEC industry in aggregate.<br>• See the "*Center Responsiveness*" measurement for the treatment of the situation where ILEC call management technology cannot measure speed of answer on a call basis from receipt to answer. |

| **Reporting Dimensions:** | **Excluded Situations:** |
|---|---|
| • Operator Services in Aggregate<br>• Directory Assistance<br>• Processing Method (human versus machine processes) | • Call abandoned by customers prior to answer by the ILEC OS or DA operator |
| **Data Retained Relating To CLEC Experience:** | **Data Retained Relating To ILEC Performance:** |
| • Month<br>• Call Type (OS or DA)<br>• Mean Speed of Answer<br>• Standard Error for Mean Speed of Answer | • Month<br>• Call Type (OS or DA)<br>• Mean Speed of Answer<br>• Standard Error for Mean Speed of Answer |

# Service Quality Measurements

## Measurement Detail

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| **Performance Standard in Absence of ILEC Results:** | If the ILEC does not deliver direct comparative results or the ILEC has not produced benchmark levels based upon a verifiable study of its own operation as agreed to with the CLEC, then result(s) related to the CLEC operation should be provided according to the following levels of performance in order to provide the CLEC with a meaningful opportunity to compete:<br>• More than 90% of call involving answer by a "live" agent, separately for OS and DA services, are answered within 10 seconds.<br>• All calls involving answer by a Voice Response Unit, separately for OS and DA services, are answered within 2 seconds. |

# Service Quality Measurements
## Measurement Detail

### Network Performance (NP)

| **Function:** | **Network Performance Parity** |
|---|---|
| **Business Implications:** | The perceived quality of CLEC retail services, particularly when either ILEC services are resold or UNE combinations are employed, will be heavily influenced by the underlying quality of the ILEC network performance. Customers experience the quality of the service provider each time services are used. This metric monitors, when collect for both the CLEC and ILEC and then compared will help show whether CLEC network performance is at least at parity with ILEC network performance. |
| **Measurement Methodology:** | **Network Performance Parity = Σ(Network Performance Parameter Result)/(Number of Tests Conducted)**<br><br>**For CLEC Results:** Based upon a random and statistically reliable (at a preset level) sample of network configurations employed by the CLEC, the network performance parameter (as indicated in the reporting dimension) is monitored based upon generally accepted testing procedures and the resulting parameter value(s) recorded. The measured values are accumulated across the sample base and the mean and associated variance computed<br><br>**For ILEC Results:** The approach is identical to that described for the CLEC, except that the network performance is measured only for representative ILEC service configurations.<br><br>**Other Clarifications and Qualification:** |

| **Reporting Dimensions:** | **Excluded Situations:** |
|---|---|
| • Transmission Quality (See Appendix A)<br>• Speed of Connection (See Appendix A)<br>• Reliability (See Appendix A) | • None |
| **Data Retained Relating To CLEC Experience:** | **Data Retained Relating To ILEC Performance:** |
| • Report Month<br>• Reporting Dimension<br>• Mean Performance Result<br>• Standard Error of Mean Performance<br>• Number of Data Points<br>• Geographic scope | • Report Month<br>• Reporting Dimension<br>• Mean Performance Result<br>• Standard Error of Mean Performance<br>• Number of Data Points<br>• Geographic scope |

| | |
|---|---|
| **Performance Standard in Absence of ILEC Results:** | If the ILEC does not deliver direct comparative results or the ILEC has not produced benchmark levels based upon a verifiable study of its own operation as agreed to with the CLEC, then result(s) related to the CLEC operation should be provided according to the following levels of performance in order to provide the CLEC with a meaningful opportunity to compete:<br>• Performance Standards in this area are yet to be published. |

# Service Quality Measurements
## Measurement Detail

### Interconnection/Unbundled Elements and Combinations (IUE)

| **Function:** | **Availability of Network Elements** |
|---|---|
| **Business Implications:** | As CLECs use individual elements as well as element combinations to deliver unique services, it is essential that the UNE functionality operate properly due to the crucial role played by such elements in providing quality retail services. This measure monitors individual network element or element combinations, that do not have an apparent retail analog, to assure that CLECs have a meaningful opportunity to compete through access to and use of element (or combination) functionality. |
| **Measurement Methodology:** | **Function Availability[1] = (Amount of Time[2] a Functionality is Useable[1] by a CLEC in a Specified Period)/(Total Time[2] Functionality Was Intended to Be Useable)**<br><br>***Notes:***<br>**1. These measure may also be expressed in the negative, that is, in term of unavailability.**<br>**2. *In some instances, rather than time, the availability will be express in terms of* transactions executed successfully compared to transactions attempted.**<br><br>**For CLEC Results:** Availability will be measured for each unique UNE functionality (or combination of UNEs) that deliver a unique functionality that does not have a reasonable retail service analog. The number of times that the functionality executes properly will be shown in comparison to the number of times that the execution of the functionality was requested or initiated. Availability can apply to both physical and logical (e.g., database) elements. Physical element availability (e.g., links to databases, dedicated transport, etc.) will typically be expressed as the % of time that the functionality is useable compared to the total time in the period being observed. "Useable" will typically means that, when monitored, the element indicates readiness to operate (e.g., an electrical (or equivalent) continuity is detected, expected signaling is returned, etc.). Logical element availability will typically be expressed in terms of the number of transactions successfully executed (e.g., successful database updates, success query responses) compared to the number of transactions attempted.<br><br>Illustrative examples of availability measures are shown below<br><br>• A-link: minutes unavailable per year<br>• D-link: seconds unavailable per year<br>• databases: percentage of queries receiving a response<br>• databases: percentage of transactions experiencing time-outs<br>• databases: percentage of queries experiencing a return of unexpected values<br>• routing: percentage of calls blocked<br><br>**For ILEC Results:** Identical measurements are performed where the ILEC employs the same or reasonably comparable functionality. Where such analogs do not exist, the ILEC is expected to establish benchmark performance levels jointly with the CLEC requesting the functionality.<br><br>**Other Clarifications and Qualification:** |

| | |
|---|---|
| | • The preceding list of elements is illustrative and is not to be considered exhaustive<br>• ILEC failure to provide timeliness performance that is no worse than what its own operations experience when using comparable functionality or, where comparable functionality is not employed, failure to meet or exceed parameters established as result of negotiation with the CLEC, constitutes failure to deliver nondiscriminatory access.<br>• For each element or element combination requested, where a retail analog is not identified, the ILEC is expected to establish both a availability measure and an availability standard (ILEC functional analog or negotiated) unless the CLEC waives its right for such a measure.<br>• Typical databases for which standards are currently expected are AIN, LIDB and 800 Number. |

| **Reporting Dimensions:** | **Excluded Situations:** |
|---|---|
| • By unique UNE or UNE combinations requested by the CLECs | • None |
| **Data Retained Relating To CLEC Experience:** | **Data Retained Relating To ILEC Performance:** |
| • Month<br>• Element or Element Combination Identification<br>• Result for Agreed Upon Availability Parameter | • To Be Determined |

| | |
|---|---|
| **Performance Standard in Absence of ILEC Results:** | If the ILEC does not deliver direct comparative results or the ILEC has not produced benchmark levels based upon a verifiable study of its own operation as agreed to with the CLEC, then result(s) related to the CLEC operation should be provided according to the following levels of performance in order to provide the CLEC with a meaningful opportunity to compete:<br>• Performance Standards in this area are yet to be published. |

# Service Quality Measurements
## Measurement Detail

| **Function:** | **Performance of Network Elements** |
|---|---|
| **Business Implications:** | As CLECs use individual elements (as well as element combinations) to deliver unique services, it is essential that the UNE functionality operates in a timely manner because of the crucial role played by such elements in providing quality retail services. This measure monitors individual network element (or element combinations), that do not have an apparent retail analog, to assure that CLECs are afforded a meaningful opportunity to compete when element (or combination) functionality is utilized. |
| **Measurement Methodology:** | **Timeliness of Element Performance = (Number of Times Functionality Executes Successfully Within the Established Timeliness Standard)/(Number of Times Execution of Functionality was Attempted)**<br><br>**For CLEC Results:** Timeliness will be measured for each unique UNE (or combination of UNEs) that delivers unique. The number of times that the functionality executes properly within the established standard time frame will be accumulated and shown in comparison to the number of times that the execution of the functionality was requested or initiated.<br><br>*Illustrative examples of timeliness measures are shown below:*<br><br>• Database Updates: % completed within 24 hours<br>• Post Dial Delay: % calls routed to CLEC OS platform within 2 seconds<br><br>**For ILEC Results:** Identical measurements are performed where the ILEC employs the same or reasonably comparable functionality. Where such analogs do not exist, the ILEC is expected to establish benchmark performance levels jointly with the CLEC requesting the functionality.<br><br>**Other Clarifications and Qualification:**<br><br>• The preceding list of elements is illustrative and is not to be considered exhaustive<br>• ILEC failure to provide timeliness performance that is no worse than what its own operations experience when using comparable functionality or, where comparable functionality is not employed, failure to meet or exceed parameters established as result of negotiation with the CLEC, constitutes failure to deliver nondiscriminatory access.<br>• For each element (or element combination) requested where a retail analog is not identified, the ILEC is expected to establish both a timeliness measure and a timeliness standard (ILEC functional analog or negotiated) jointly with the requesting CLEC unless that CLEC waives its right for such a measure.<br>• Typical databases for which standards are currently expected are AIN, LIDB and 800 Number.<br>• Comparisons of performance should be based upon the criteria for which the element was engineered. For example, if the element was engineered based upon average busy hour criteria, the comparison should be based upon the CLEC busy hour period (likewise for criteria such as busy day, busy season, or ten high days). |

# Service Quality Measurements

## Measurement Detail

| **Reporting Dimensions:** | **Excluded Situations:** |
|---|---|
| • By unique UNE or UNE combinations requested by the CLECs | • None |
| **Data Retained Relating To CLEC Experience:** | **Data Retained Relating to ILEC Performance:** |
| • Month<br>• Element or Element Combination Identification<br>• Result for Agreed Upon Availability Parameter | • To Be Determined |
| **Performance Standard in Absence of ILEC Results:** | If the ILEC does not deliver direct comparative results or the ILEC has not produced benchmark levels based upon a verifiable study of its own operation as agreed to with the CLEC, then result(s) related to the CLEC operation should be provided according to the following levels of performance in order to provide the CLEC with a meaningful opportunity to compete:<br>• Performance Standards in this area are yet to be published. |

# Service Quality Measurements
## Measurements Detail
### Appendix A: Reporting Dimensions

| | |
|---|---|
| **Standard Service Groupings:** | • Resold Residence POTS<br>• Resold Business POTS<br>• Resold Residence ISDN<br>• Resold Business ISDN<br>• Resold Centrex/Centrex-like<br>• Resold PBX trunks<br>• Resold Channelized T1.5 service<br>• Other Resold Services<br>• UNE Platform (at least DS0 loop + local switch + transport elements)<br>• UNE Channelized DS1 (DS1 loop + multiplexing)<br>• Unbundled DS0 Loop<br>• Unbundled DS1 Loop<br>• Other Unbundled Loops<br>• Unbundled Switch<br>• Other UNEs |
| **Standard Order Activities:** | • New Service Installations<br>• Service Migrations Without Changes<br>• Service Migrations With Changes<br>• Local Number Porting<br>• Move and Changes Activities<br>• Feature Changes<br>• Service Disconnects |
| **Pre-Ordering Query Types:** | • Due Date Reservation<br>• Feature Function Availability<br>• Facility Availability<br>• Street Address Validation<br>• Service Availability Information<br>• Appointment Scheduling<br>• Customer Service Records<br>• Telephone Number<br>• Rejected of Failed Queries (regardless of type) |
| **Transmission Quality Parameter:** | • Subscriber Loop Loss<br>• Signal to Noise Ratio<br>• Idle Channel Circuit Noise<br>• Loop-Circuit Balance<br>• Circuit Notched Noise<br>• Attenuation Distortion |

# Service Quality Measurements
## Measurements Detail
### Appendix A: Reporting Dimensions

| | |
|---|---|
| **Speed of Connection Parameters:** | • Dial Tone Delay<br>• Post Dial Delay<br>• Call Completion/Delivery Rate |
| **Reliability Parameters:** | • Network Incident Affecting >5000 Blocked Calls<br>• Network Incidents Affecting >100,000 Blocked Calls |
| **Disposition and Cause:** | • Out of Service No Dispatch<br>• Out of Service With Dispatch<br>• Hold Open for Monitoring<br>• Customer Premise Equipment Trouble (including Inside Wire)<br>• No Trouble Found<br>• Central Office Equipment<br>• Interoffice Facilities<br>• Loop/Access Line<br>• All Other Troubles<br>• No access<br><br>*"Out of Service" means that the customer has no dial tone.*<br>*"Dispatch" means that ILEC repair personnel must be dispatched to a location outside an ILEC building (to customer premises or other off-site facilities) to resolve the trouble.* |

# Service Quality Measurements
## Measurements Detail
## Appendix B: Glossary

A

**Abandoned Call:** An abandoned call occurs when the caller hangs up after the call has been delivered, but before the receiving party has answered the call.

**Attenuation Distortion:** Attenuation Distortion" should measure the variation in loss at different frequencies across the voice frequency spectrum (200Hz - 3400 Hz).

B

**Call Completion Rate** The call completion rate for CLEC customers is determined by calculating the total number of calls placed by CLEC customers that were completed to the calling destination. The number of completed calls is then divided by the total # of call attempts made by CLEC customers during the reporting period.

**Call Delivery Rate** The **call delivery rate** for CLEC customers is determined by calculating the total # of calls received by CLEC customers. This number of delivered calls is then divided by the total # of call attempts received by the ILEC for termination CLEC customers.

**Completion:** A "completion" is the transaction that the ILEC sends to the CLEC to inform the CLEC that a requested order has been completed.

D

**Data Response:**

**Dial Tone Delay:** The "Dial tone delay" is determined for each trial completed during the reporting period by computing the time that transpires from a customer's going off-hook and the receipt of dial tone from the servicing central office. It should be measured in seconds and tenths of seconds. "Post dial delay" for each trial is determined for each trial completed during the reporting period by computing the time that transpires from when the last digit is dialed until a valid response is received by the customer. It should be measured in seconds and tenths of seconds

E

F

**FOC** A "FOC" is a Firm Order Confirmation notification, which is the transaction that the ILEC will send to the CLEC to confirm that an order can be completed.

G

H

| | |
|---|---|
| Held Orders: | "Held orders" are orders that the ILEC has confirmed (an FOC was returned to the CLEC) and that are overdue. |

I

| | |
|---|---|
| Idle Channel Circuit Noise | The idle channel circuit noise for each trial is determined for each trial completed during the reporting month by computing the difference between the noise that exists in the channel when no signals are present and the reference noise. The resulting accumulated idle channel circuit noise for all trials is divided by the total # of trials completed during the reporting period. |
| Interface: | The "interface" is the ILEC interface that allows the CLEC to access the ILEC system |
| Internal or Administrative Use: | |

J

| | |
|---|---|
| Jeopardy | A "jeopardy" is a transaction that the ILEC sends to the CLEC to inform the CLEC that a previously FOC'd order cannot be processed as specified in the original FOC. |

K

| | |
|---|---|
| Loop-circuit Balance | "Loops-circuit balance" should be measured in decibels and tenths of decibels above the reference noise. "Attenuation Distortion" should measure the variation in loss at different frequencies across the voice frequency spectrum (200Hz - 3400 Hz). It should be measured from the NID to the switch, and from the switch to the NID. It is measured by subtracting the loss at 1004 Hz from the loss at the frequency of interest, and should be reflected in tenths of decibels. |

M

N

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|---|---|
| Network Incident: | A "Network incident" is an unplanned network occurrence that results in blocked calls |

O

P

| | |
|---|---|
| Post Dial Delay: | "Post dial delay" is the time that transpires from when the last digit is dialed until a valid response is received by the customer |

Q

R

| | |
|---|---|
| Receipt of Order: | |
| Return of Valid Completion: | |

S

| | |
|---|---|
| Signal to Noise Ratio: | Signal to Noise ratio is the ratio of usable signal being transmitted to the noise or undesired signal. |
| Subscriber Loop Loss: | The subscriber loop loss is by computing the difference between the strength of the signal as it enters the loop and the strength of the transmitted signal. Signal strength is measured in decibels rounded to the nearest tenth of a decibel. The resulting accumulated decimal strength is divided by the total number of trials completed during the reporting period. |
| Subsequent Reports: | Customer trouble reports where the customer calls to check on the status of a previous trouble report (initial or repeat) that has not been cleared (closed or resolved) at the time of the call. |
| Syntax Reject: | A "syntax reject" is the transaction that an ILEC will return to a CLEC when a the CLEC has submitted an order transaction that the ILEC's gateway cannot process due to violation of published rules for formatting or content. |
| System: | The "system" is the combination of ILEC gateways, communications links, hardware and software that, in combination, is used to perform or support business functions or execute supporting transactions. |

T

| | |
|---|---|
| Troubles | "Troubles" include all reported difficulties with performance of resold services or UNEs, whether the report is the initial or a repeated report, that the CLEC refersto the ILEC repair process/interface for resolution. Subsequent reports are categorized seperately. |
| Trouble Appointment: | A "trouble appointment" is a commitment made by the ILEC (to CLEC or to customer) to resolve a trouble. |
| U | |
| V | |
| W | |
| X | |
| Y | |
| Z | |